DEVELOPMENT OF MANAGEMENT MODEL FOR GREEN STURGEON IN SACRAMENTO/SAN JOAQUIN WATERSHED

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Public Comments

No public comments were received for this proposal.

Technical Synthesis Panel Review

Proposal Title

#0331: DEVELOPMENT OF MANAGEMENT MODEL FOR GREEN STURGEON IN SACRAMENTO/SAN JOAQUIN WATERSHED

Final Panel Rating
adequate

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

The overall goals of the project are to develop a population viability analysis of Green sturgeon. This will be accomplished by collecting important details of sturgeon biology including: age and size at maturity, spawning frequency, movement and habitat use –; effects of methyl−mercury on embryo development, survival, juvenile growth, bioaccumulation, swimming performance, measures of biochemical accumulation; genetics to identify population differences between Klamath and Sacramento Rivers. A individual−based population viability model will be constructed for GS to identify potential life−stage bottlenecks for GS. The strengths of the proposal are that it is work needed to fill in knowledge gaps of GS, an at−risk species. Each individual sub−project will contribute essential knowledge needed for management and conservation. The methods were fairly well described. Age and growth of wild sturgeon will be estimated from fin rays, and spawning frequency interpreted by changes in Sr/Ca ratios detected by LA−ICP MS to interpret spawning frequency. The Sr/Ca will be calibrated from controlled experiments on hatchery sturgeon at varying salinity levels. The PVA will be patterned after a previous model for white sturgeon, and model parameters provided through these and prior GS studies. Movement will be

interpreted from radio telemetry. Genetic analysis will be from samples of wild adults returning to spawn.

Additional Comments:

Problems of this study are lack of integration and coordination among various PIs. This is a case of the sum of the parts being equal ore greater than the whole. The authors propose an initial planning meeting, at which they will present state of knowledge, and share information needed for component efforts. There are no subsequent meetings planned. Particularly for the modeling effort, this is a drawback. No hypotheses were given, although a series of potential bottlenecks were discussed. The PVA model could have been better thought out. The PI will construct this after the project is started. Data needs not gained from this study are ocean and estuary habitat not well known. Also not known are survival estimates for the juvenile and adult stages. The fin ray microchemistry analysis will not work because sturgeon fin rays are not metabolically inert. In other words, unlike otoliths, material is re−absorbed over time. Therefore, this analysis will not provide an accurate record of spawning frequency.

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Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

Development of Management Model for Green Sturgeon in Sacramento/San Joaquin Watershed

The panel liked that the study focuses on an important species and the proposal will fill important gaps in data. A major weakness of the proposal was that there were not enough details presented on the integration between tasks. Only one meeting at the beginning of the project would be held, but more meetings in the future were not planned. The proposal also does not provide enough information about the PVA model that would be developed. Another weakness identified was a lack of coordination among principal investigators.

The secondary reviewer rated the proposal lower than the primary reviewer, in part because of problems with the laboratory experiment with mercury, and the lack of an approach to use mercury in the model. Citing the Oak Ridge study only was not sufficient as justification for showing a lack of relationships between Hg in the environment and bioaccumulation. Many studies in sites that were not grossly contaminated with mercury have shown significant correlations with fish uptake and bioaccumulation. The researchers could go ahead with a bioenergetics approach for mercury uptake −− several models have been developed to incorporate this approach.

The panel considered the levels of methyl mercury used in the lab study to be too high. The proposed levels were not considered environmentally relevant.

The panel noted that this proposal overlaps with proposal 85, which also deals with green sturgeon.

The panel noted that trace elements in fin spines are remobilized and cannot be used to trace past spawning habitat. The proposed use of Sr/Ca ratios as an index of spawning frequency in this way is therefore not appropriate.

Because it deals with an important species, the panel would have rated this proposal more highly if there were fewer methodological problems.

Rating: adequate

Technical Review #1

proposal title: DEVELOPMENT OF MANAGEMENT MODEL FOR GREEN STURGEON IN SACRAMENTO/SAN JOAQUIN WATERSHED

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**The goals, objectives, and hypotheses are clearly stated and internally consistent. The ideas are timely and important, but I am concerned that the PVA model will be very difficult to parameterize.**
Rating	**excellent**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**The study is justified relative to existing knowledge. The conceptual model is clearly stated and explains the underlying basis for the proposed work. The selection of research is well−justified.**
Rating	**excellent**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**The approach is well−designed and appropriate. The results are likely to add to the knowledge base. It is likely to generate novel methods and approaches. The information will be useful to decision−makers even if the PVA model cannot be fully parameterized.**
Rating	**very good**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**The approach is well documented and technically feasible. Its likelihood of success is high. The scale is consistent with objectives and well within the grasp of the authors.**
Rating	**excellent**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**The monitoring is well−designed, and there are well−defined plans to interpret the monitoring data.**
Rating	**excellent**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**The products will be valuable for management decisions. Contributions to larger data management systems are relevant and well−considered.**

	Interpretable outcomes are likely and well documented.
Rating	excellent

Additional Comments

Comments	None

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	The authors have excellent track records. The project team is well qualified to implement the project. They have infrastructure and support needed to complete the project.
Rating	excellent

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The budget is reasonable and adequate.
Rating	excellent

Overall

Provide a brief explanation of your summary rating.

Comments	Most aspects of the project are well though out. My only reservation is that the PVA model used as an organizing principle may be impossible to fully parameterize, since so much basic data (e.g., spawning population abundance, most life-stage survival rates) are unknown and in many cases are unlikely to be uncovered by the proposed work.

Technical Review #1

Rating	**excellent**

Technical Review #2

proposal title: DEVELOPMENT OF MANAGEMENT MODEL FOR GREEN STURGEON IN SACRAMENTO/SAN JOAQUIN WATERSHED

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**Green sturgeon is clearly a species of importance in the CALFED program and the need for more information on this species is well justified. Most aspects of the biology of this endangered fish are poorly known and past studies by the investigators have made some progress. The project includes separate studies on the physiology, reproductive biology, genetics, and movement of these fish. The results of these studies are to be integrated for a whole species assessment of threats using a population viability analysis (PVA). The use of PVA as an integrative element in the project is not well justified or described. I feel the proposed effort is largely a collection of distinct sturgeon studies with little effort devoted to forming a complete picture of green sturgeon status or a clear way to identify the relative impact of potential threats.**
Rating	**good**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**Weak understanding of the basic biology of this**

	species justifies further effort on the component studies of this project. A very general conceptual model of the life stages and habitat use of the fish is given in a chart and briefly described. This serves mainly to show where different life stages occur in the system but it does not provide a firm basis for integrating results for assessing species status on the whole. While a first step to understanding threats, it does clearly demonstrate the utility of a population viability analysis with present and expect knowledge.
Rating	**good**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**The four component studies (physiology, reproductive biology, genetics, and movement) cover key aspects of the basic biology of green sturgeon. Each is likely to yield new information and some novel findings mostly because so much basic biology has yet to be documented. The methods employed in each study component are sound and have a record of yielding new understanding on mobile, long−lived species, especially sturgeon. Most have been applied in past sturgeon research to obtain new facts and measures on a species. In a few cases (e.g., genetics of different costal populations) the information to be produced is more valuable for species level knowledge than system specific information. Overall, a collection of new biological facts would likely be valuable to system managers in recognizing potential threats. I do not think the findings will go far in guiding conservation measures or designing ways to minimize population losses.**
Rating	

	very good

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**Methods to be used in each component study are well described and have been shown effective in past sturgeon studies. Some have a measure of risk (telemetry on low numbers of fish, hard parts microchemistry) but are worth attempting. Not much is given on how these different study results would contribute to a population viability analysis, and details of this integrating task are not clearly explained.**
Rating	**good**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**Population monitoring is not directly addressed but new information on species biology would contribute to decisions on how to best sample and document fish abundance and locations. A directed effort at producing a monitoring design could have been proposed but instead a whole population assessment is planned.**
Rating	**good**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**Addressed in above comments – each distinct component study can yield new information on the species. The use of PVA to tie new information together at the species level is not convincing, and was not described in a way that contributes to a larger information set.**
Rating	**good**

Additional Comments

Comments

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	**The named investigators by component study have a record of producing new information on sturgeon biology. Each has expertise and analysis capability to conduct the described investigations. There seems to be little record of working closely together for a unified species analysis, and not much effort is devoted to doing that in the project plan.**
Rating	**very good**

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	**The 2 year total cost for this project is high but the different lab and field tasks can be expensive. Close coordination among study groups may have been able to achieve some cost savings.**
Rating	**very good**

Overall

Provide a brief explanation of your summary rating.

Comments	**The study of basic species biology is valuable for poorly known fishes like green sturgeon. That merits support in this case. However, the organization of this effort around population viability analysis as a way to pool data and findings seems weak and it is poorly described. Also, little effort is devoted at pooling team expertise and coordinating the different tasks. I must conclude this project is best considered as a collection of related studies on a single species without a real plan for doing more.**
Rating	**very good**

Technical Review #3

proposal title: DEVELOPMENT OF MANAGEMENT MODEL FOR GREEN STURGEON IN SACRAMENTO/SAN JOAQUIN WATERSHED

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	**This is a well written proposal that clearly states the objectives (basically to develop a population viability analysis) and hypotheses. Given the apparent low population size of Green Sturgeon, the proposed work is very timely.**
Rating	**excellent**

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

Comments	**This proposal builds on prior as well as ongoing research on Green Sturgeon by the principal investigators and their research teams. The proposed work is a natural extension of the research program on Green Sturgeon. The conceptual model helps one to understand how the various tasks fit into the overall project.**
Rating	**excellent**

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	**The overall approach to the project is well designed. Task I (PVA model) is nicely explained in terms of the components of the model. The supporting biological information for this task is nicely integrated and shows a solid understanding of what is known of the biology of Green Sturgeon. The only place where more information would have been useful is in the estimation of survivorship of adults and juveniles, although this information may not be available. There were also some problems with clarity in this section. For instance, what is meant by "older" Green Sturgeon? Are these subadults, adults or ?? Also, for the mortality rate of 0.15 taken from the unpublished report by Beamesderfer and Webb (2002), one has to assume that this represents annual percent survival rather than some other time interval. All in all, the modeling approach provided in Task 1has the potential to make important contributions to management of Green Sturgeon. Task 2 supports model development by providing information on spawning biology and ecological requirements. A major component of this task is the determination of movement patterns based on sonic telemetry using an existing array of remote monitors. The study plan is to use the automated acoustic monitors to obtain general patterns of movement and, once a fish is detected by the automated monitor, to use a boat−deployed receiver to locate fish and obtain specific habitat data. As written, it states that data will be downloaded from the automated monitors every two weeks (par. 1, p. 11) or every month (par. 3, p. 11) and that the data from the remote receivers will be used to guide manual tracking in areas known to contain fish. Given the speed at which sturgeon can move, is monthly or semi−monthly**

	checking frequent enough, especially during the spring migration, to locate fish by the boat−deployed receiver (e.g., fish may have moved through the area and be many km upstream in the span of two weeks). These questions aside, the large number of remote receivers and the apparent availability of fish for tag implantation should result in very useful data. Task 3 supports model development by providing data on reproductive biology. Because tags are implanted surgically (Task 2), this allows visual determination of gonadal development as well as the ability to obtain biopsies of gonadal tissue. Task 4 includes determination of Green Sturgeon ages and age of entry into fresh water for input into Task 3 and model development. The study plan includes complete removal of the pectoral spine, which, according to Collins and Smith, 1996) is non−deleterious to the fish. However, it is possible to remove a 1−2 mm section of pectoral fin spine using jewelers saws and to use this section for aging fish. This causes much less alteration to the fin and thus may be preferable, especially for listed species (see Rochard and Jatteau, 1991, Amelioration de la methode de determination de l'age de l'esturgeon commun Acipenser sturio et premieres applications, p. 193–208. In: P. Willot (ed.). Acipenser. Cemagref. Task 4 also includes determination of methyl mercury effects on growth, survival and performance of laboratory reared Green Sturgeon. This information then feeds into the population viability model. Task 5 deals with population genetics of Green Sturgeon using microsatellite loci. Collection of tissues for genetic analysis has been ongoing for up to four years (depending upon river system) so that there is already a supply of material for analysis. This work is particularly important in that it will allow determination of the interdrainage movement potential of Green Sturgeon.
Rating	**very good**

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	**Overall, I find the approach section to be quite well done and indicative of a strong potential for solid scientific work to come from this project. The work flows nicely from earlier studies so that the likelihood of success is very high. The expertise of the investigators is appropriately matched with the project tasks.**
Rating	**excellent**

Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	**This is not a monitoring proposal**
Rating	**not applicable**

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	**This project is well designed and should yield important information on Green Sturgeon conservation. There are appropriate plans for data management. Given the track record of the P.I.'s, there is no doubt that useful publications will come from this study.**
Rating	**excellent**

Additional Comments

Comments	**I find this to be a very well conceived and well written proposal with the promise of providing important information on Green Sturgeon conservation. Because there are multiple P.I's on the project, and because Tasks 2–5 are designed to feed data into Task 1, it is very important to keep all parties in communication. An initial planning meeting is scheduled (Task 1, p. 5); however, I could not find mention of subsequent planned meetings. Clearly it is important to maintain frequent contact, either through virtual meetings or actual quarterly or semi–annual meetings (in the budget there is money for two trips per year for Jager to come to Davis).**

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	**The principal investigators make up a very impressive team for this project– in fact I would be hard pressed to think of more qualified people for the proposed work. The individual track records of the scientists are very impressive. The infrastructure and other support systems are well established for the completion of this project.**
Rating	**excellent**

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	**The overall budget at just over one million dollars for two years is expensive, but not when the amount of work and the number of P.I.'s is considered (ca, $100,000 per year per P.I.).**

Rating	**excellent**

Overall

Provide a brief explanation of your summary rating.

Comments	**I rate this project as excellent overall. The project design flows nicely from previous data and leads towards a logical next step in the conservation of Green Sturgeon. The principal investigators are all highly qualified and nicely matched to each of the proposals main tasks. The proposal is well written and well organized. The probability of strong success is about as good as it gets with studies of this nature.**
Rating	**excellent**